

WHY FORBS?

Forbs (any broadleaf plant) have become recognized as desirable for both livestock and wildlife uses in native grasslands. The value of legumes (a type of forb), such as alfalfa, the clovers, lespedeza, and birdsfoot trefoil, has long been recognized in cool season pastures and hayfields. They add nitrogen to the soil, improve the protein and mineral content of the forage base, and increase the number of wildlife species that use the field. Native legumes, such as Illinois bundleflower, partridge pea, wild senna, purple and white prairie clovers, roundhead bushclover (lespedeza), and leadplant could provide similar benefits to native grass plantings. In addition, work in the Great Plains states have shown that native legumes and other forbs, such as blacksamson, rattlesnake master, the sunflowers, the gayfeathers (blazing stars), penstemons, coneflowers, and compassplant are also palatable and sought out by livestock during certain times of the growing season.¹ Forbs are also beneficial to birds, butterflies, and other insects and wildlife.²

As more fields are planted to mixtures of grasses and forbs to enhance applications for producers entering fields into the Conservation Reserve (CRP) or the Wildlife Habitat Incentives Programs (WHIP), the need becomes greater to know how to establish forbs into existing and planned grass stands. There is also a need to know how to manage them to maintain a proper ratio of forbs to grasses. Tall grass prairie plantings have recommended forb percentages in the seed mix of 50-60% (by weight).³ Proper management will also give the landowner better return on money spent on seeding.



Photo by Lynn Betts USDA-NRCS

ESTABLISHMENT

The single most important consideration in forb establishment is site preparation. Establishment methods will vary depending on whether the landowner is planting into an existing native grass stand; a non-native cool or warm season grass stand – such as fescue or Bermuda grass – or a cropland. Planting methods, both conventional and no-till, can be found in the Field Office Technical Guide (FOTG) Section IV - Restoration and Management of Declining Habitats specifications. Ensuring good seed to soil contact and planting seeds no deeper than 2x their diameter is important regardless of the type of stand being planted into. Planting seeds too deep, particularly small-seeded species, will greatly diminish their germination and establishment. A firm seedbed is critical to avoid planting seeds too deeply. A good rule of thumb is that the field is ready to seed if your footprint barely makes an imprint on the soil. If your footprint sinks in more than ½ inch, use a cultipacker or other tool to firm the seedbed.

Croplands

Croplands are often free of problem perennial weeds. These fields can usually be planted into directly after the final cropping year. If there are no perennial weeds such as johnsongrass, forbs and shorter-growing less aggressive native grasses can be planted the following spring. To enhance successful establishment of forbs, delay planting taller, more aggressive grasses, such as big bluestem and switchgrass, until the following year. If problem weeds are present, they should be eradicated before planting. To control perennial weed species, make one or more applications of systemic herbicides to kill underground reproductive structures. Once weeds are controlled, the field can be planted as outlined above. Annual weeds, common in croplands, can stunt seedling growth, but rarely smothers out the stand.



Photo by Tim McCable USDA-NRCS

ESTABLISHMENT (CONTINUED)

The fairly new herbicide imazapic (trade name PLATEAU®) controls many weed species, while permitting desired grasses and forbs to establish. Some grasses, such as sideoats, blue grama, eastern gamagrass and especially switchgrass are sensitive to PLATEAU®. Sunflowers and sedges do not appear to be tolerant. Others not listed on the label, such as the blazing stars (*Liatrix spp.*) roundhead lespedeza, beebalm (*Monarda spp.*) and penstemon may tolerate low levels (i.e. 4 oz/ac.) of PLATEAU® either pre-or-post emerge, but not enough research was done on these species to include them on the label.⁴ Some herbicides used in agricultural crops have lengthy residual periods. Even minute amounts of these herbicides can injure or kill forb seedlings. Knowing the herbicide history of cropfields where forbs are to be planted is essential.

Existing Native Grass Stands

Planting forbs into established native grass stands will involve weakening the grass long enough for the new forb seedlings to get started. Generally, the best way is to heavily graze or burn* the grass in the fall about 1-2 months ahead of the normal first killing frost. Close mowing can also be carried out but will be less effective unless the clippings are removed. The field can then be lightly disked 2 inches deep to expose 30-70% bare earth or strip sprayed to weaken or kill no more than 50% of the stand. The forbs can then be drilled or broadcast seeded during the dormant or frost seeding dates. The field should then be mowed to 6-8 inches whenever the grass(es) or annual weeds reach 18 inches (about knee height) for the first year or two until the forbs become established. If grasses or weeds become too tall, so that there is a danger of smothering the forb seedlings when mowed, do not mow unless the clippings can be quickly removed from the field. Stop mowing if windrowing behind the mower is observed, and removal of the clippings is not possible. Mowing a less dense stand will not smother forb seedlings as readily as mowing a dense stand of the same height.

Existing Cool Season Grass Stands

Planting forbs into existing cool season grass stands can be done the same way as with native grass stands, if the stand is comprised of non-aggressive species, such as timothy, redtop, or orchardgrass. If more aggressive species, such as tall fescue, smooth brome, Reed Canarygrass, or nonnative warm season grasses, such as Bermuda or Caucasian bluestem are present, the stand should be completely killed before forb planting. Complete renovation of the stand can be accomplished by first eradicating the existing stand and problem weeds, then seeding the new seed mixture at the appropriate time. To eradicate the existing stand, remove the vegetative material and allow new growth, which will be more susceptible to systemic herbicides. Graze heavily or burn* in the fall as described above, then let the grass regrow for 10 days to 2 weeks to expose rapidly growing leaf surfaces. Then spray with a translocating herbicide such as glyphosate. The next spring, spray any grass or broadleaf weed that may have escaped or germinated after the first application. Delay planting until competitive plants have been controlled. In some cases, it may be necessary to let the ground lay fallow one full growing season and use shallow disking (2-3 inches deep) and/or herbicides to kill newly germinated weeds every 2-3 weeks. Avoid tilling deeper than 2-3 inches to prevent bringing additional weed seeds up to the surface. Use herbicides rather than tillage on erosive sites. A combination of mowing, tillage, and spraying will work better than a single method where perennial species such as johnsongrass are present. Plant forbs and grasses in the dormant or spring seeding period after weeds and existing vegetation are controlled. Follow specifications under Conservation Cover (327) or Restoration and Management of Declining Habitats (643) in the FOTG for planting dates and rates.

Photo by Lynn Betts USDA-NRCS



* Always follow a Prescribed Burn Plan for the site with date(s) and needs present.

MANAGEMENT

Planted fields should be kept mowed to less than 18 inches during the establishment phase. Once established, the field will need to be managed so that the grasses do not crowd out the forbs over time. Controlled (prescribed) grazing and burning, strip disking, and mowing are tools that can be used to manage the grasses and forbs.

Grazing

Uniform, frequent defoliation of the grasses to a height of 8 inches for warm season grasses and 3 inches for cool season grasses will enable sunlight to penetrate to the ground, allowing germination of forbs. A grazing system which allows for 30-40 days of rest for warm season grasses and approximately 20 days of rest for cool season grasses, between 3 to 5 day grazing periods, has been shown to allow beneficial annual forbs to reseed themselves and allow for white clover to maintain



Photo by Lynn Betts USDA-NRCS

itself in the stand. During the growing season grazing needs to be resumed after the rest period to prevent the grasses from out-competing the legumes and forbs. Research has shown that when pastures were allowed to rest for 8 weeks, white clover declined to only 10% of the stand.⁵ While we are not aware of similar studies done on native legumes or forbs, it may be assumed that they will behave in a similar fashion.⁶ Discontinue grazing in the fall soon enough to allow the grass to reach 12 inches before the first hard frost in the fall (see FOTG Prescribed Grazing 528A standard for approximate dates). This allows the plants to store enough food reserves in their roots and crowns before they go into dormancy to survive the winter and grow vigorously the next spring.

Prescribed Fire

Fire which occurs at the proper time of year removes dead litter and allows sunlight to reach the soil surface, encouraging germination of forbs and legumes. A prescribed burn plan must be completed before any fires are started. The burn plan will identify suitable weather conditions, personnel and equipment needed, adjacent and in-field hazards, and safest firing method, in addition to the time of year to conduct the burn for the best management results. Any necessary burn permits will be attached to the burn plan. See the Prescribed Burn Plan Standard and Specification (338) in the Field Office Technical Guide for more information and a sample burn plan. Only NRCS employees with adequate Job Approval Authority can write burn plans and/or participate in a prescribed burn.

Burns will most likely be needed only every 3-4 years on grazed fields. More frequent burns may be necessary when the field is not grazed so that sunlight can reach the ground, increasing forb germination. To keep some wildlife habitat, no more than 1/2 the field or fields should be burned in any one year (1/3 to 1/4 is even better). This will also help conserve beneficial butterflies and other insects. If a particular insect is of concern, its host plant should be identified and mapped prior to burning, and every effort should be made to avoid burning all host plants in any one year. Early season burns generally favor forbs and cool season grasses. An early burn for Illinois is generally one conducted in February to late March. Burns conducted after the warm season grasses start growing (around mid-April, after 1-3 inches leaf growth) will favor warm season grasses over forbs. Burns may also be done in the winter after dormancy on fields not subject to erosion to favor forbs and other cool season plants over warm season grasses. Occasionally, fall burns may be used when the fields can be burned safely and with no danger of significant erosion before growth begins the following spring. Fall and winter burns both tend to increase forbs over grasses.



Photo by Bob Dayton USDA-NRCS

Management with prescribed burning or grazing should be enough to enable forbs to maintain or reestablish themselves if the seed source exists.⁷ The land should be rested long enough to allow the forbs to reach and maintain themselves at least at the minimum grazing heights, according to the Prescribed Grazing Standards and Specifications in the Field Office Technical Guide.

MANAGEMENT (CONTINUED)

Strip Disking

Disking strips in fields to expose no more than 50% bare dirt can open up the canopy and set back the grasses enough so that forbs can reestablish themselves. If the field has not been grazed, mowing prior to disking may be necessary to get the 50% bare dirt exposed. Disked strips should be narrow enough, and spaced far enough apart, to prevent erosion. Generally, disked strips should be no wider than 20 feet, be worked on the contour, and take up no more than 20% of the field to minimize erosion. Strips can be alternated so that after 5 years, the entire field has been disked. Strip disking should be done in the fall to early spring (prior to April 1st) period.

Another advantage to strip disking is that additional large-seeded forbs can be dormant or frost seeded after disking.

Strip Mowing

Mowing can help open up the canopy so that sunlight can reach the soil surface if cuttings are removed. Forbs should increase in the mowed area the next growing season. Mowing should be done August through April 1st. No more than 50% of a field should be strip mowed in any one year. The mowed area should not be in one large block, but in several strips throughout the field.

Mowing is generally not as beneficial to increasing forbs in a field as burning, grazing, or disking, but can be good if the cuttings can be taken off the field.



Photo by Lynn Betts USDA-NRCS

¹ Pasture and Range Plants, Phillips Petroleum Co., G.W. Tomanek, et.al., 1963.

² North American Range Plants, J. Stubbendieck, et.al. 1981.

³ The Tallgrass Restoration Handbook, Stephen Packard, et.al., 1997.

⁴ Dr. Jennifer Vollmer, per comm, American Cyanamid Co., Parsippany, NY.

⁵ Grass Productivity, Andre Voisin, 1959.

⁶ Ceci Dale-Cesnat, per. comm., USDA-NRCS Rangeland Management Specialist, Susanville, CA.

⁷ J.R.Gerrish, per. comm., Research Assistant Professor, Univ. of Missouri – Forage Systems Research Center, Linneus, MO.

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COMMON ILLINOIS FORBS ESTABLISHED IN GRASS PLANTINGS

PLANT	Palatable for Livestock	Wildlife Benefited	Site Best Suited	IL Suit-ability Zone(s)	Comments
Asters and Fleabanes	Cattle - poor, Sheep - fair	Insects, primarily - deer, rabbits, grouse & turkey - low usage	Dry to Wet, depends on species selected	I, II, III	Small blue or white flowers
Baptisia spp. (Wild indigos)	Yes - when dried. Mildly toxic if eaten in large amounts in spring	Unknown	Dry - Mesic	I, II, III	Sap used to be used to dye clothing purple.
Bee Balm (Monarda)	No	Insects, primarily	Dry to Mesic	I, II, III	Beautiful pinkish flowers
Black-eyed Susan	No	Insects, primarily	Dry to Mesic	I, II, III	Easy to establish, cheap
Blazing Stars (Gayfeathers)	Yes	Insects, primarily	Dry to Wet, depends on species selected	I, II, III	Beautiful blue flowers
Cassia spp. (Partridge Pea, Wild or Maryland Senna)	Yes	Quail, prairie chicken, and deer	Dry to Wet, depends on species selected	I, II, III	Legume, beautiful yellow flowers, annuals
Coneflowers	Yes	Insects, primarily - small birds and deer	Dry to Mesic, except for Ratibida lacinata, which is FACW	I, II, III	Beautiful flowers
Goldenrods	Cattle - poor, Sheep - poor to fair, depending on species.	Insects, primarily - small birds, prairie chicken, deer, small mammals - low usage	Dry to Wet, depends on species selected	I, II, III	Forms colonies, common weed
Illinois Bundleflower	Yes	Unknown - deer?	Dry - Mesic	I, II, III	Legume
Leadplant	Yes	Unknown - deer?	Dry - Mesic	I, II, III	Legume - unique smoke-colored plant
Lobelias (incl. Cardinal Flower)	No - poisonous if force fed	Insects, primarily	Wet	I, II, III	Beautiful deep red or blue flowers
Milkweeds (incl. butterfly weed)	No - poisonous if force fed	Insects, primarily	Dry to Wet, depends on species selected	I, II, III	Butterfly weed has beautiful orange flowers
Penstemons (Beardtongues)	Yes	Insects, primarily - Small birds and mammals, deer	Dry - Mesic	I, II, III	Beautiful light blue irregular flowers
Prairie Clovers	Yes	Many birds and mammals	Dry - Mesic	I, II, III	Pretty purple or white flowers
Rattlesnake Master	Yes	Unknown	Dry - Mesic	I, II, III	Striking yucca-like plant
Round-headed Lespedeza (or Bush Clover)	Yes	Quail, deer, and turkey	Dry - Mesic	I, II, III	Legume
Silphiums (compassplant, cup plant, and prairie dock)	Yes	Unknown	Dry - Wet, depending on species selected	I, II, III	Stately, large plants with yellow flowers
Sunflowers	Yes	Many birds and mammals	Dry - Wet, depending on species selected	I, II, III	Can be aggressive, plant 10 oz./acre or less. Large, nutritious seeds.

References:

Pasture and Range Plants, Fort Hays State University, Hays, KS

North American Range Plants; J. Stubbendieck, et. al.; University of Nebraska Press

American Wildlife & Plants: A Guide to Wildlife Food Habits; Martin, Zim, and Nelson; Dover Publications, Inc.